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Proven in the world's great hospitals

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Thermovision®: The infrared scanning system presenting a dynamic display of heat patterns in the human body.

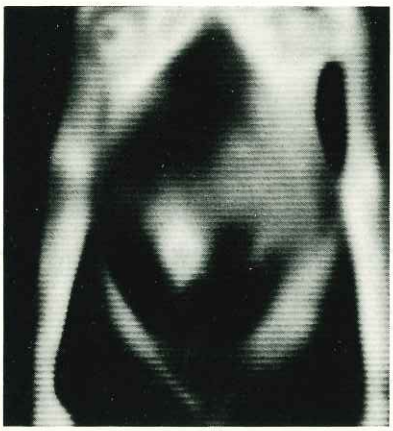
Thermovision®: A valuable diagnostic tool utilized at a wide range of medical institutions—including many of the world's great hospitals.*

Columbia University Presbyterian Hospital	New York, New York USA
McGill University Royal Victoria Hospital	Montreal, Quebec, Canada
Chattanooga Memorial Hospital	Chattanooga, Tennessee USA
Beth Israel Hospital	New York, New York USA
Albert Einstein Medical Center	Philadelphia, Pennsylvania USA
George Washington University Medical Center	Washington, D.C. USA
Miami Heart Institute	Miami Beach, Florida USA
Johns Hopkins University Medical Center	Baltimore, Maryland USA
Oklahoma University Medical Center	Oklahoma City, Oklahoma USA
Hadassah Hospital	Tel Aviv, Israel
University of Missouri	Columbus, Missouri USA
Helsingfors Universitet Centralsjukhuset	Helsinki, Finland
Städtische Krankenanstalten	Hamburg, West Germany
Klinik "Rechts Der Isar"	Munich, West Germany
Klinikum der Universität	Essen, West Germany
Radiumhemmet Karolinska Sjukhuset	Stockholm, Sweden
Göteborgs Universitet Anatomiska Institutionen	Gothenburg, Sweden
Hospital Cantonal Universitaire	Lausanne, Switzerland
Royal Infirmary	Edinburgh, United Kingdom
Churchill Hospital	Oxford, United Kingdom
Westminster Hospital Department of Physics	London, United Kingdom
Strahleninstitut und Klinik der Freien Universitat Berlin	Berlin, West Germany
Ospedale Alberti San Giovanni Valdarno	Arezzo, Italy
Varese Hospital Centro Oncologico	Varese, Italy
Hospital for Rheumatic Diseases	Bath, United Kingdom
Gerzen's Cancer Institute	Moskow, USSR

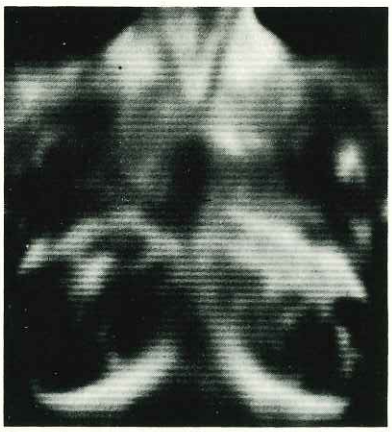
*Partial Listing

Thermovision®: Provides the physician with original and complementary information, unavailable with any other diagnostic method.

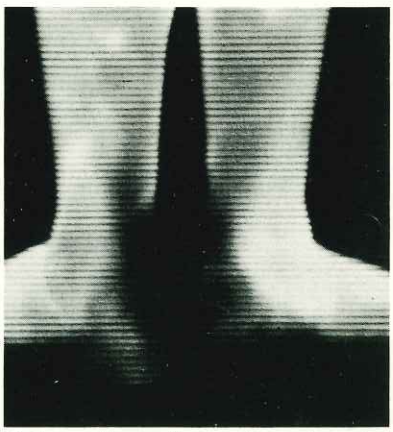
Thermovision®: A valuable tool utilized for a wide range of medical applications.



Obstetrics and gynecology: *placental localization,** early detection of pregnancy, breast pathology,



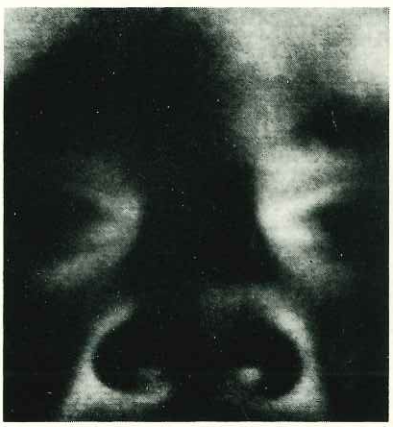
Oncology: detection of both *primary and metastatic carcinoma,** clinical evaluation of therapy,



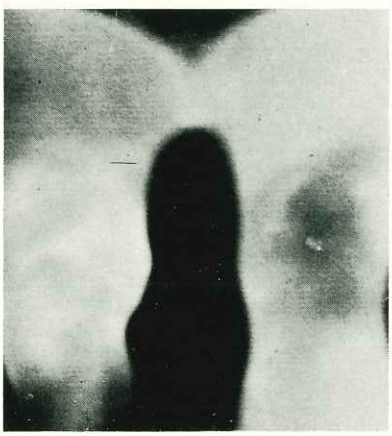
Orthopedics: diagnosis and evaluation of herniated discs, fractures, *sprains,** contusions, localized infections,

Industrial and occupational medicine: evaluation and observation of progression of *soft tissue injuries,**

Peripheral vascular disease: arterial insufficiency, thrombophlebitis, *varicose veins,** vasospastic phenomena,



Cerebrovascular disease: extracranial *arterial stenosis** and/or occlusions,



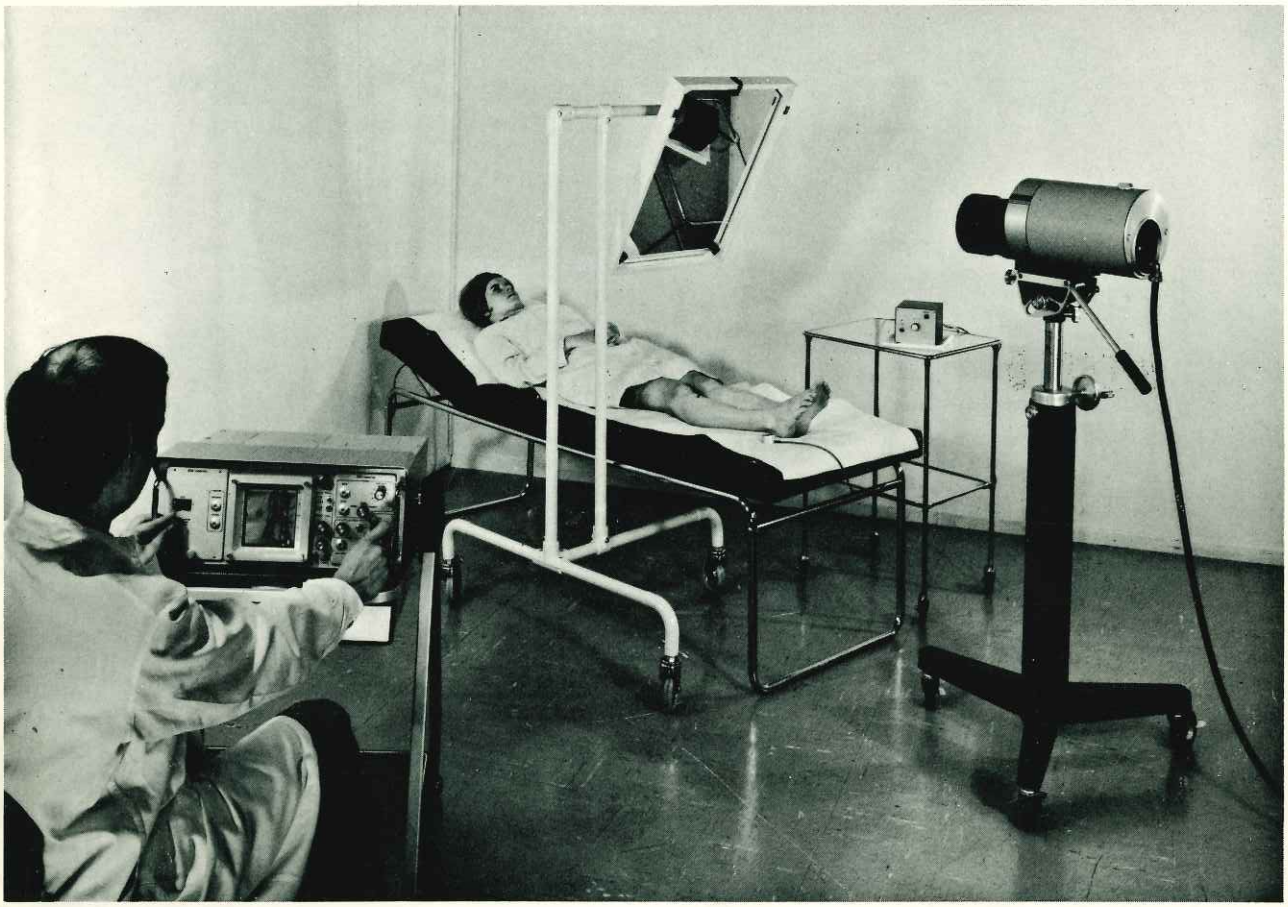
Rheumatism and arthritis: detection and evaluation of *inflammatory joint processes,**

Dermatology: degree and depth of *burns** and frostbite injuries, plastic surgery,

Opthalmology: *proptosis of the eye,** intraocular tumors, skin tumors, inflammation, vascular disorders, trauma, opaque media.

*Thermogram shown

Thermovision® is the first and only thermographic system offering a high speed, high resolution image in black and white and instantaneous color



Thermovision® displays the thermal pattern of the human body live on infrared TV.

In the black and white image of the primary Thermovision display unit brightness variation corresponds to temperature gradient in the body.

The image of the color slave monitor presents simultaneously 10 color coded isotherms permitting immediate and accurate quantitative analysis of the patient's heat pattern.

The images may be instantaneously recorded on polaroid, 35mm, or 70mm film.

A recording adapter for magnetic tape storage or a synchronized 16mm movie camera permit the dynamic recording of transient temperature changes.

Only Thermovision offers the physician these significant benefits:

- ☐ High quality thermograms—continuous image display
- ☐ Minimum patient discomfort—rapid scanning procedures
- ☐ Reproducible image fidelity
- ☐ Ease of operation—few controls
- ☐ High operational efficiency
- ☐ Equipment mobility
- ☐ A wide choice of accessories

If you would like to examine Thermovision more closely, please contact us.
We would appreciate the opportunity to meet with you personally.

AGA Corporation, 550 County Avenue, Secaucus, New Jersey 07094 ~~(201) 886-3344~~
(201) 866-3344

AGA THERMOVISION® SYSTEM 680

Colour monitor

For live colour display of up to 10 simultaneous colour-coded isotherms

Opens up new possibilities for thermography in medicine

In determining the depth and extent of burn injuries, for example, the colour monitor displays isothermal colour contours which can be adjusted to show the lack of circulation in tissues with full thickness burns. The extent of the burn area requiring surgical treatment can then be marked on the patient while observing the marker on the monitor screen. Surgery can start earlier and the risk of infection and the time of hospitalization are thereby reduced. In follow-up surgery the colour monitor is also useful in evaluating the viability of skin grafts at an early stage.

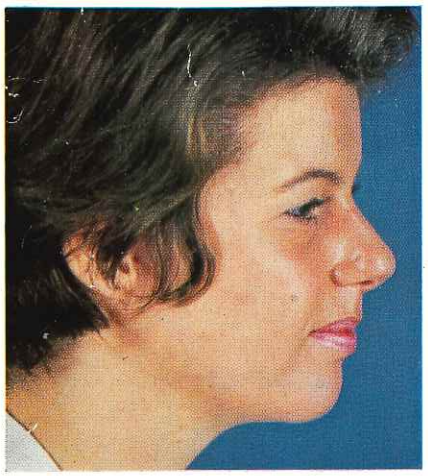
Another medical application involves dynamic studies of peripheral circulation: the thermal reaction of the skin surface as a result of stimulus of the sympathetic nervous system can be observed directly on the colour monitor screen in the form of isotherm colour variations.

. . . and industry

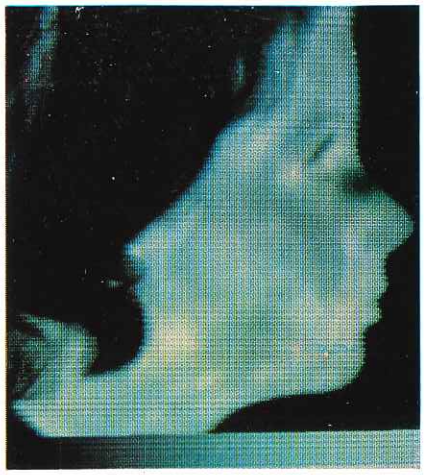
In industry, applications exist for the colour monitor wherever transient or dynamic thermal phenomena are studied, e. g. production process development, structural fatigue testing, machine tool evaluation, etc. A useful technique is to record the Thermovision video signals of single thermal events on magnetic tape, and during successive playbacks vary the isotherm colours to observe different aspects of the same event.

Three distinct operation modes

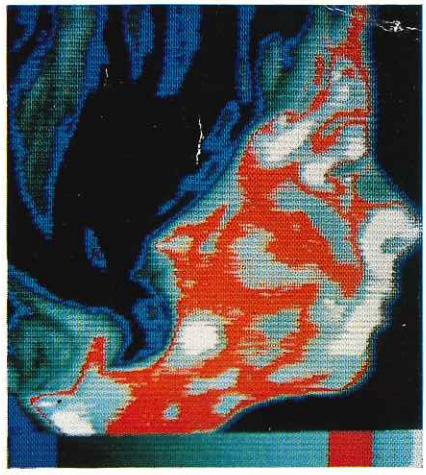
In MONO, the monitor displays the conventional gray-tone thermal picture enlarged approximately 2X the size of the normal Thermovision display. In MIX, the monitor functions as a gray-scale display, with colours capable of being added to the monochrome thermal images. In the COLOUR mode the monitor presents one or more colour isotherms without the gray-tone image.



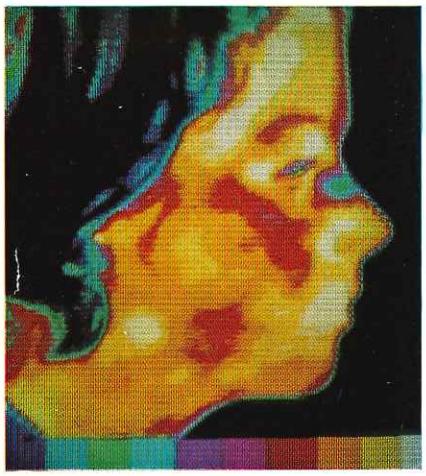
Conventional photograph of the face as seen in the visible-light spectral band.



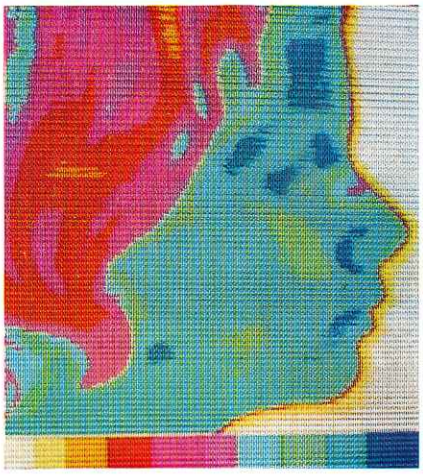
Appearance of the face when scanned by Thermovision in the middle infrared band, and displayed on the colour monitor in the MONO (monochrome) mode.



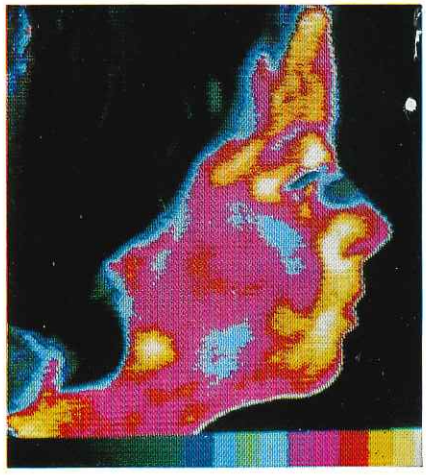
Example of 3 isotherms coded in arbitrary colours and superimposed on the monochrome thermal picture in the MIX (monochrome plus colour) mode.



An all-colour isotherm display obtained in the COLOUR mode: white is warmest and blue coolest with the 8 other colours distributed in between.



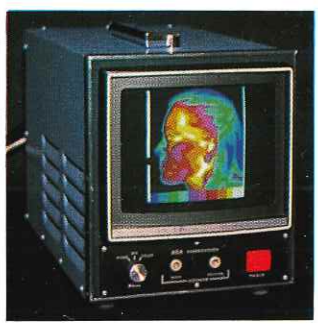
The inverted temperature presentation, with the colour sequence unchanged, produces reversed isotherm colours where white is coolest, blue warmest.



With the isotherm colours compressed and repositioned, the MIX mode provides the surrounding gray-tone details to help orient the isotherm pattern.

Multicolour isotherms added to the gray-tone thermal picture display

An enlarged version of the Thermovision gray-tone thermal picture is presented by the monitor upon which individually colour-coded isotherms can be superimposed. Up to 10 different isotherms can be observed on the monitor screen simultaneously for visualizing dynamic temperature patterns of objects. The isotherm colour code representing the temperature gradient covered by the thermal picture from cooler to warmer can be varied without limit. Colour isotherm widths can also be individually adjusted.



Specifications

Colour monitor CM700:	Order 556 900 303.
Isotherm colours:	Dark blue, light blue, dark green, light green, violet, magenta, red, orange, yellow, white.
Picture size:	13×18 cm (5×7 in).
Display tube:	Sony Trinitron® 9-inch TV monitor.
Line voltages:	100/120/140/200/220/240 VAC, 50—60 Hz.
Power:	120 VA
Dimensions:	25×30×50 cm (10×14×16.5 in) (W×H×L).
Weight:	18 kg (40 lb).

AGA

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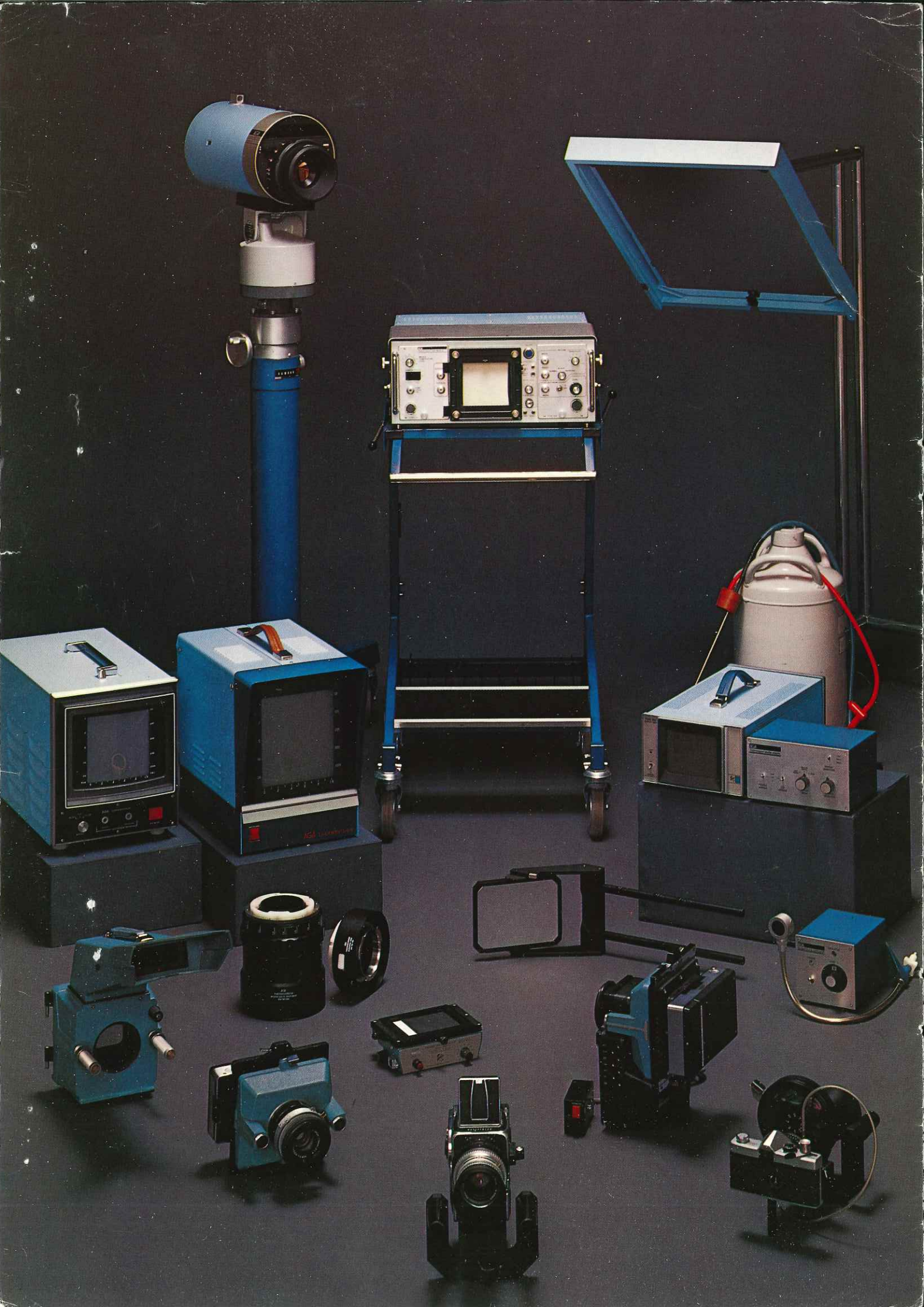


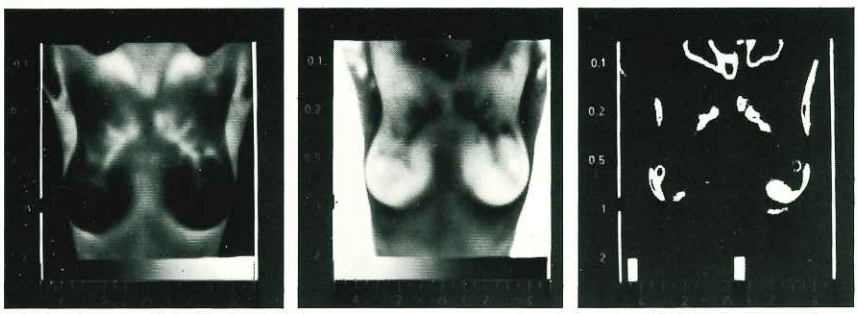
AGA Thermovision 680 Medical is an easily operated system for clinical thermography.

Thermovision 680 Medical consists of a scanning camera and a display unit, which form a compact and mobile system. The thermal image of the patient is presented on the 6″ screen of a high resolution TV tube.

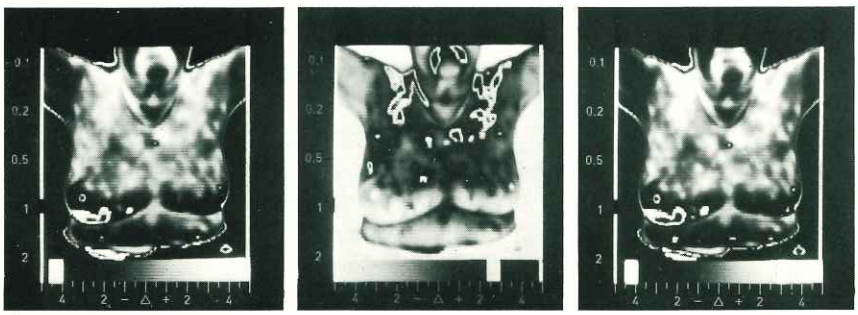
The scanning camera unit receives the heat radiation emitted from the patient through a wide angle lens which allows a short operating distance from the patient. In the case of breast examination, only 1.2 meters (4 ft) is required.

On the display unit the heat image is presented live at a rate of 16 times per second. As a result optimal adjustment of the operating controls can be assured by direct observation of the thermal image before a photographic recording is made. The few and easily manipulated controls for brightness, contrast and focus are all located on the display unit.

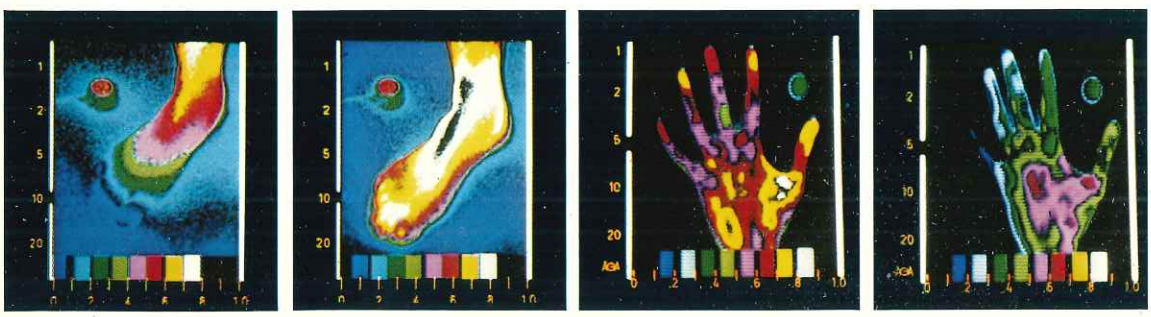
The image can be presented in three ways. In the "normal" mode, hot areas are bright; in the "inverted" mode, dark. The gray-tone image may also be suppressed for isotherm display alone.



The isotherm function is used to measure temperatures and relative differences with an accuracy of 0.1°C. Superimposed on the gray-tone image they are displayed as saturated white areas. A built-in scale indicates the difference between any number of temperature levels which may be chosen for isotherm presentation. In the examples the mid-position in the scale corresponds to 30°C. Two isotherms can be used simultaneously and the temperature difference read directly, as in the example =7.4°C.



Color Thermography was first introduced by AGA. It provides in one picture a quantitative record of temperature differences. The thermograms are composed of a sequence of color coded isotherms recorded with special camera attachments or presented live on AGA's unique Color Monitor. The two thermograms on the left show a case of thrombosis in the femoral artery. A 5°C temperature rise in the toes followed reconstructive vascular surgery. Temperature difference is 1°C per color. The two thermograms on the right show the effect of smoking a cigarette. A 2—5°C temperature drop in the fingers occured within 15 minutes after lighting up. Temperature difference 0.5°C per color.



A wide range of accessories completes the System 680 Medical.

A versatile range of accessories are available to suit different requirements. Some of them may be considered standard since a majority of Thermovision owners employ them in medical thermography. Others are less frequently required and therefore more optional.

Standard accessories

1. Image recording camera with a choice of film backs:
Polaroid for instant film records.
70 mm Hasselblad for light-box viewing of full size image transparencies at low cost.

2. Data projector for recording of patient data in the thermogram.

3. Mobile pedestal supporting Thermovision camera unit.

4. Mobile cart supporting Thermovision display unit.

5. Liquid nitrogen storage container with filling device.

Optional accessories

6. Color thermogram cameras:
Manual 35 mm Minolta system for low cost color thermograms. Automatic Polaroid system for instant color thermograms.

7. Color Monitor for live-color image viewing and photographic recording.

8. Black and white Slave Monitor for enlarged image presentation.

9. Temperature reference source Model 22 for determination of absolute temperature levels.

10. Surface reflective mirror, on mobile stand for thermographing patients in supine position.

11. Small camera-mounted mirror, useful also for close-up work.

12. Close-up extension ring for highest resolution in small areas.

13. Front lans with 10° field of view.

14. Motorized pan/tilt head for remote controlled aiming of the Thermovision camera.

15. Temperature Profile Adapter for quantitative thermal analyses of individual scan lines.

Technical data, Thermovision 680 Medical.

Camera Unit

Optics

Standard Lens: AGA Infrared 53 mm f/1.8 25°×25°.

Range of optics: 0.6 m (2 ft) to infinity.

Scanned area at: 1.2 m (4 ft). 50×50 cm (20×20 in.).

Focusing: Motor-driven (remote) or manual.

Spatial resolution: 0.0025 rad (at 50% contrast) i.e. 1.2×1.2 mm on the object surface at minimal focal distance.

Detector: Indium antimonide (InSb) photovoltaic.

Spectral range: 2—5.6 μm.

Coolant: Liquid nitrogen (−196°C), 4 hours between refills.

Display Unit

Picture size: 90×90 mm (3.5×3.5 in.).

Field frequency: 16 per second.

Line frequency: 1600 per second.

Lines per frame: 210 (interlaced).

Resolving Power: 160 lines horizontally.

Features: Preset photo mode for correct film exposures, spot wobbling, random interlacing, daylight viewing.

Temperature measurement

Object temperature range: +15°C to +45°C.

Minimum detectable temperature difference: 0.1°C at +30°C object temperature.

Temperature-level operation: Differential or absolute temperature measurements with manual level control calibrated in °C from 21° to 37°C.

Sensitivity attenuator: Calibrated in 5 steps, 0.1, 0.2, 0.5, 1 and 2°C/division.

System

Operating temperature range: 0°C to +55°C.

Power requirements: 115 or 230 V AC ±10%, 200 VA, single phase 50−400 Hz.

Dimensions

Camera Unit: 200×240×490 mm (W×H×L) (7.9×9.5×19.3 in.) 13 kg (26 lb.).

Display unit: 450×200×530 mm (W×H×L) 17.7×7.9×20.8 in.) 23.7 kg (52 lb.).

Interconnection cable: 6 m (20 ft)

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Thermovision is produced by AGA, one of Sweden's largest companies, with av multinational organization established in 32 countries. AGA Thermovision, introduced in 1965, was the first real-time infrared scanning system for medical thermography. Today, AGA is the leading supplier of thermographic instruments to hospitals and private clinics all over the world.

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